

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (previously presented) In a wireless network including a plurality of nodes, a method of performing neighbor discovery, the method comprising:

generating a signal at a first node for alerting other nodes in the network of the presence of the first node, the signal comprising a spread signal;

broadcasting the signal from the first node, the broadcasted signal having a low probability of detection by an unintended receiver,

receiving the signal at a second node;

filtering the received signal at the second node using a filter matched to a spreading sequence or code used to spread the signal;

calculating an energy associated with the filtered signal;

establishing a threshold;

determining whether the energy is greater than the threshold;

identifying, by the second node, the first node as a neighbor node when the energy is greater than the threshold;

transmitting a message from the second node to the first node, the message comprising information identifying the second node;

repeating the broadcasting of the signal from the first node;

adjusting a power level associated with broadcasting the signal based on whether the message from the second node has been received by the first node; and

changing, by the first node, the spreading sequence or code used to spread the signal after a number of broadcasts.

2. (previously presented) The method of claim 1, further comprising:

identifying a spreading code to be used for transmissions from the second node to the first node, and

wherein the transmitting comprises:

transmitting the message using the identified spreading code.

3. (previously presented) The method of claim 1, wherein the transmitting includes:

identifying a directional antenna to be used for transmitting the message, and
transmitting the message using the identified directional antenna.

4. (previously presented) The method of claim 1, further comprising:

de-spreading the signal by the second node using a spreading code associated with the signal; and

determining the identity of the first node from the de-spread signal.

5. (previously presented) The method of claim 1, wherein the spread signal is spread using at least one of a frequency hopping sequence, a direct sequence or a number of short pulses in accordance with ultra-wideband radio technology.

6. (previously presented) The method of claim 1, wherein the broadcasting includes at least one of:

broadcasting the signal at random or pseudorandom intervals, or

broadcasting the signal using a combination of regular and random or pseudorandom intervals.

7. (previously presented) In a network comprising a plurality of nodes, a first node comprising:

an omni-directional antenna;

a directional antenna;

a processor configured to generate a spreading sequence that identifies the first node;

a first transmitter configured to broadcast the spreading sequence using the omni-directional antenna;

a receiver configured to receive a message from a second node, the message identifying the second node and indicating that the second node is a neighbor node; and

a second transmitter configured to transmit data to the second node using the directional antenna after the message from the second node is received,
the first transmitter being further configured to:

repeat the broadcast of the spreading sequence, and
adjust a power level associated with broadcasting the spreading sequence based on whether the message from the second node has been received, and
the processor being further configured to:

change the spreading sequence after a number of broadcasts.

8. (currently amended) The first node of claim [[9]] 7, wherein the transmitter is further configured to at least one of:

broadcast the spreading sequence at random intervals, pseudorandom intervals or a combination of regular and random or pseudorandom intervals.

9. (currently amended) The first node of claim [[9]] 7, wherein the processor is further configured to:

generate at least a second spreading sequence that identifies the first node, wherein the transmitter is configured to broadcast the second spreading sequence at random or pseudorandom intervals.

10. (currently amended) The first node of claim [[9]] 7, wherein the first transmitter is configured to:

broadcast the spreading sequence using at least one of a frequency hopping sequence, a direct sequence or a number of relatively short pulses.

11. (previously presented) A computer-readable medium having stored thereon a plurality of computer executable instructions, said instructions including sequences of instructions which, when executed by a computer, cause said computer to:

retrieve a spreading sequence that identifies a first node in a wireless network;

broadcast the spreading sequence using an omni-directional antenna, the spreading sequence having a low probability of detection by an unintended receiver;

receive a message from a second node in the wireless network, the message identifying the second node and indicating that the second node is a neighbor node;

transmit data packets to the second node using a directional antenna after the message from the second node is received;

repeat the broadcast of the spreading sequence a number of times;

adjust a power level associated with broadcasting the spreading sequence based on whether the message from the second node has been received; and

change the spreading sequence after a number of broadcasts.

12. (currently amended) The computer-readable medium of claim [[14]] 11, including instructions for causing said ~~processor~~ computer to at least one of:

broadcast the spreading sequence at random or pseudorandom intervals or

broadcast the spreading sequence at a combination of regular and random or pseudorandom intervals.

13. (currently amended) The computer-readable medium of claim [[14]] 11, wherein the instructions for causing the ~~processor~~ computer to change the spreading sequence include instructions for causing said ~~processor~~ computer to:

retrieve at least a second spreading sequence that identifies the first node; and
broadcast the second spreading sequence random or pseudorandom intervals.

14. (currently amended) The computer-readable medium of claim [[14]] 11, wherein the spreading sequence comprises at least one of a frequency hopping sequence, a direct sequence or a number of relatively short pulses.

15. (previously presented) A system for performing neighbor discovery in a wireless network, comprising:

means for generating a signal at a first node for alerting other nodes in the network of the presence of the first node, the signal comprising a spread signal;

means for broadcasting the signal from the first node using an omni-directional antenna or a set of sectored antennas;

means for receiving the signal at a second node;

means for filtering the received signal at the second node using a filter matched to a spreading sequence or code used to spread the signal;

means for calculating an energy associated with the filtered signal;

means for determining whether the energy is greater than a threshold;

means for identifying, by the second node, the first node as a neighbor node when the energy is greater than the threshold;

means for transmitting a message from the second node to the first node using a directional antenna, the message comprising information identifying the second node;

means for repeating the broadcasting of the signal from the first node a number of times;

means for adjusting a power level associated with broadcasting the signal based on whether the message from the second node has been received; and

means for changing a spreading sequence used to spread the signal after a number of broadcasts.

16. (previously presented) In a network including a plurality of nodes, a method of performing neighbor discovery, the method comprising:

broadcasting a spreading sequence from at least a first node in the network using an omnidirectional antenna, the spreading sequence having a low probability of detection by an unintended receiver and being used to alert other nodes in the network of the presence of the first node;

detecting, by at least a second node in the network, the first node using a filter matched to detect the spreading sequence used by the first node;

identifying, by the second node, the first node as a neighbor;

selecting, by the second node, a directional antenna;

transmitting a message from the second node to the first node using the directional antenna,
the message comprising information identifying the second node;
broadcasting the spreading sequence a number of times;
adjusting the power level associated with the broadcasting based on whether a reply
message, indicating that at least the second node has detected the spreading sequence, has been
received by the first node; and
changing the spreading sequence after a number of broadcasts.

17. (currently amended) The method of claim ~~[[35]]~~ 16, further comprising:
determining a spreading code to be used for transmissions from the second node to the first
node; and
wherein the transmitting a message comprises:
transmitting the message using the determined spreading code.

18. (previously presented) A first node in a wireless network comprising:
an omni-directional antenna;
a directional antenna;
a transmitter configured to transmit a signal for alerting other nodes in the network of the
presence of the first node via the omni-directional antenna, the signal comprising a spread signal
that is spread using at least one of a direct sequence, a frequency hopping sequence or a number of
short pulses; and

a receiver configured to receive a message from a second node in the network, the message identifying the second node as a neighbor node and being sent in response to the second node detecting the signal from the first node, and

wherein the transmitter is further configured to:

repeat the transmission of the signal,

adjust a power level at which the signal is transmitted based on whether the message from the second node has been received, and

transmit data packets to the second node using the directional antenna after a neighbor relationship with the second node has been established,
the first node further comprising:

a processor configured to change a spreading sequence or code used to spread the signal after a number of transmissions.